REMARKS/ARGUMENTS

Claims 1-20 were pending and examined. The Examiner objected to the title and the drawings. The Examiner rejected claims 2-6 under 35 USC § 112, second paragraph, as being indefinite. The Office Action indicates claims 1-4, 6-9, 11, and 13-20 are rejected under 35 USC § 102(b) as being anticipated by Wang et al. (U.S. Patent No. 5,187,769) hereinafter referred to as Wang. The Office Action indicates claims 11-12 are rejected under 35 USC § 102(b) as being anticipated by Yamada et al. (U.S. Patent No. 6,438,680) hereinafter referred to as Yamada. The Office Action indicates claim 5 is rejected under 35 USC § 103(a) as being unpatentable over Wang in view of Matsuo et al. (U.S. Patent No. 5,901,301) hereinafter referred to as Matsuo. The Office Action indicates claim 10 is rejected under 35 USC § 103(a) as being unpatentable over Wang in view of Golliver et al. (U.S. Publication No. 2002/0004809) hereinafter referred to as Golliver.

In this response, Applicant has amended claims 1, 4, 7-10, canceled claims 2-3, 5-6, and 11-20, and added new claims 21-34. Claims 1, 4, 7-10, and 21-34 remain pending.

Title Objection

The Office Action objected to the title as being not descriptive. Applicant has submitted a new title as part of this document. Applicant respectfully requests the Examiner to consider the new title and withdraw the objection.

Drawing Objections

The Office Action objected to the drawings as not depicting the ability to store and operate on complex numbers consisting of real and imaginary portions. Claims 15 and 20 have been canceled. Applicant believes that the drawing object is overcome by amendments to claims 9 and 10. Accordingly, Applicant requests the Examiner to reconsider and withdraw the drawing objections.

Claim rejections under 35 USC § 112

The Examiner rejected claims 2-6 under Section 112, second paragraph, as being indefinite. Claims 2, 3, has been canceled

Claim rejections under 35 USC § 102(b)

The Office Action rejects claims 1-4, 6-9, 11, and 13-20 under 35 USC § 102(b) as being anticipated by Wang. The Office Action rejects claims 11-12 under 35 USC § 102(b) as being anticipated by Yamada.

Claim rejections based on Wang

In response to the anticipation of claim 1, Applicant has amended claim 1 to include a vector register file and to clarify the vector unit. The vector register file has a primary register file and a secondary register file. Each register field in the vector instruction indicates a register in the primary register file and a corresponding register in the secondary register file. Thus, a first register field of the instruction identifies a first primary register in the primary register file and a first second register in the secondary register file.

The vector unit performs the first operation on a first set of three operands and the second operation on a second set of three operands. Thus, the instruction corresponds to a set of six register operands. The first set of operands includes a first operand chosen from either the first primary or first secondary register, a second operand chosen from either the second primary or second secondary register, and a third operand chosen from the third primary or third secondary registers. In the same way, the second set of operands includes a first operand chosen from either the first primary or first secondary register, a second operand chosen from either the second primary or second secondary register, and a third operand chosen from the third primary or third secondary registers.

Thus, all six of the operands are provided from either the primary or secondary register file.

Wang does not anticipate claim 1 as amended because Wang does not describe a vector execution unit for instructions having three operand registers in which all of the operands are

provided by a rank-of-two register file (i.e., a register file have a primary register file and a secondary register file). Instead, Wang discloses a vector coprocessor that includes a set of three parallel execution units and a register unit having three register files (reference numerals 40, 42, and 44). Wang specifically emphasizes the parallelism between its vector coprocessor and the 3D vectors that it is designed to execute efficiently. See, e.g., Wang, Abstract: "The 3DVCP specifically targets vectors of length 3, and exploits the intrinsic parallelism by providing three parallel execution units that can simultaneously operate on all three vector components. " Wang emphasizes a three-wide data path as an important feature of its vector coprocessor. See, e.g., Column 8, line 48-53. Wang's three wide data path is supported by its three wide register file including register files 40, 42, and 44. Thus, Wang discloses and emphasizes a three wide coprocessor including a three wide register file to execute vector instructions.

In contrast to Wang's three wide vector coprocessor, claim 1 as amended recites a two-wide vector register file for use in executing three operand instructions. The use of a two-wide register file to support vector instructions beneficially reduces the amount of cross bar circuitry required to implement the unit. This reduction in circuitry is achieved without substantially reducing flexibility in selecting operands for the first and second operations.

Because Wang does not disclose either expressly or inherently a vector processing unit that uses a two-wide register file, Applicant submits that claim 1 as amended is not anticipated by Wang. Accordingly, Applicant respectfully requests the Examiner to reconsider and withdraw the anticipation rejection of claim 1 and, by their dependency on claim 1, claims 4, and 7-9, which were also rejected as anticipated by Wang. Claims 2, 3, 6, 11, and 13-20 are canceled.

Claim rejections based on Yamada

In response to the rejection of claims 11 and 12 as anticipated by Yamada, Applicant has canceled claims 11 and 12.

Claim rejections under 35 USC § 103(a)

Claim rejections based on Wang and Matsuo

The rejection of claim 5 as being unpatentable over Wang in view of Matsuo is moot in view of Applicant's cancellation of claim 5.

Claim rejections based on Wang and Golliver

The Office Action rejected claim 10 as unpatentable over Wang in view of Golliver. Applicant submits that the rejection is improper because the cited references do not disclose or suggest all of the claim limitations including the limitations introduced by the amendments to base claim 1. Specifically, neither Wang nor Golliver teach or suggest a two-wide register file for use in executing three operand instructions.

New claims

New claims 21-34 have been added including new independent claims 25 and 31. All of these new claims are believed to recite elements not found in the cited references.

New claim 25 recites a vector unit including a register file including a primary and a secondary register file and primary and secondary calculating units. The vector processes instructions containing three register fields. Multiplexing circuitry is operable to select each of a first set of three operands and a second set of three operands from the primary and secondary register files. The primary calculating unit receives the first set of operands while the secondary calculating unit receives the second set of operands.

New claims 31 recites an execution unit and a rank of two register file. The execution unit recites asymmetric instructions includes three input operands. A value in any input operand field identifies a register in a primary register file and a corresponding register in the secondary register file. The execution unit performs a first operation on a first set of three operands selected from registers identified by the set of operand register fields and a second operation on a second set of three operands also selected from the registers identified by the set of operand

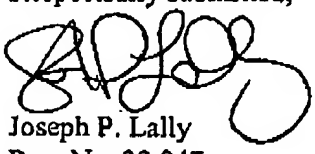
registers fields. The first and second operations and selection of the first and second sets of operands are determined by the opcode.

Applicant submits that both of these independent claims are allowable over the cited references. Accordingly, Applicant respectfully requests examination and favorable action for the new independent claims and their respective dependent claims.

CONCLUSION

In the present response, Applicant has addressed the objections to the title and drawings, and responded to the Examiner's claim rejections under Section 112, second paragraph, Section 102(b), and Section 103(a). Accordingly, Applicant believes that this response constitutes a complete response to each of the issues raised in the office action. In light of the amendments made herein and the accompanying remarks, Applicant believes that the pending claims are in condition for allowance. Accordingly, Applicant requests the Examiner to withdraw the rejections, allow the pending claims, and advance the application to issue. If the Examiner has any questions, comments, or suggestions, the undersigned attorney would welcome and encourage a telephone conference at 512.428.9872.

Respectfully submitted,



Joseph P. Lally
Reg. No. 38,947
ATTORNEY FOR APPLICANT(S)

LALLY & LALLY, L.L.P.
P.O. Box 684749
Austin, Texas 78768-4749
512.428.9870
512.428.9871 (FAX)

JPL/mmm

Attachments